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ABSTRACT

Two studies were conducted to test the view that the early reading difficulties experienced by boys result from a "difference" in the way they use language, not their "deficit" in language ability. The first study replicated previous findings that young boys outperform young girls in receptive language ability although they perform less well in reading achievement. The sex difference in receptive language ability was viewed as part of a more fundamental difference as to how boys and girls interact with their environment. This contention was supported by the second study, which demonstrated a link between "behavioral expressiveness" and poor reading performance for boys but not for girls. (Author/RL)

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Sex Differences in Receptive Language and Behavioral Expression
as They Relate to Early Reading Achievement

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Sex Differences in Receptive Language and Behavioral Expression
as They Relate to Early Reading Achievement

The present study examines sex differences in language reception and modes of behavioral expression that may play an important role in accounting for sex differences in learning to read. Thus, girls as a group, demonstrate fewer difficulties in the acquisition of reading skills than boys: Maccoby and Jacklin (1974) report that reading problems are from three to 10 times more common in boys; Entwisle (1971) states that 90 percent of all referrals to reading clinics are males; Dwyer (1973), in her review, states that girls characteristically learn to read earlier and achieve higher scores on standardized reading tests--especially in the primary grades. While these studies indicate little agreement regarding the reason for this phenomenon, the evidence strongly suggests that it does exist, both in English speaking as well as non-English speaking countries (Blom, Jansen & Allerup, 1976).

The search for an explanation of these sex differences in reading performance has led to two possibly interacting causal factors: physiological-maturational, and cultural-societal. It is either something in the child or something in the way "society" (i.e., parents and teachers) responds to the child. Many of those who subscribe to the former view argue that sex differences in reading achievement can be accounted for by sex differences in perception and cognition. Harris (1976) goes a step further, theorizing that sex differences in perception and cognition are mediated by sex differences in brain lateralization. According to Harris, females show more equivalence between hemispheres as far as language functioning is concerned while males are less bilateral, more asymmetric, in this regard. If language is more bilaterally controlled in females, especially at the beginning of the school years, it could be an advantage

due to the nature of the early reading process. Thus, Bakker (1979) concludes that, because of its perceptual demands, early reading proficiency is associated with "moderate lateralization" of the language function; reading at the later ages, on the other hand, "flourishes in the presence of a strong lateralization of receptive language" (p. 139-40).

In addition to differences in hemispheric specialization, McGuinness and Pribram (1979) hypothesize that a second factor is involved in cognitive processing differences between sexes: males and females evidence different response "biases". Boys, more motorically active and impulsive, evidence superiority in exploratory and manipulative action. McGuinness and Pribram argue, on the other hand, that "the nearest one can come to describing a central trait for females is to subsume many of their skills under the heading of communication" (p. 32). They further write: "It is not that the female is inactive, but that her activity is directed toward more communicative aims" (p. 24). These response tendencies are partly attributable to differences in the way "muscle competencies" are organized in males and females; however, they actually result from a complex interaction between certain physiological factors and environmental influences. In support of the McGuinness and Pribram view, McCall (1971) indicates that males in infancy require more motor interaction with their environment than girls in order to learn from it.

Brimer (1969) has suggested a similar thesis as a partial explanation for male-female differences in early reading proficiency. Actually, his hypothesis represents an attempt to reconcile seemingly anomalous results relating to sex differences in "listening comprehension" (perhaps more appropriately labeled receptive language ability) and reading comprehension. Thus, data from Brimer's study (1969), and data from a number of other

studies as well, show that males are better listeners while females are better readers, especially during the early grades. Brimer contends that these results reflect sex differences in the way language is used. Language primarily serves a communicative function for females. Males, on the other hand, rely less upon verbal utterance as a way of controlling their environment. In the absence of expressive speech competence, listening becomes the skill males employ to control the environment "through selective, nonverbal response to verbal stimuli" (Brimer, personal communication). This preferred mode of receiving meaning places boys at a distinct disadvantage when they are taught to read. Brimer argues that, whatever methods of teaching reading are used, the predominant strategy is to make the child "speak at print". If methods of teaching reading could be found that are not speech dependent, Brimer contends, perhaps the male reading disadvantage would be lessened or even eliminated. Unfortunately, Brimer points out, it is difficult to convince teachers of reading that a child can learn to read through listening.

How much support is there for Brimer's hypothesis? Brimer's measure of receptive language ability was a slightly modified form of the Peabody Picture Vocabulary Test (Dunn, 1965) which he standardized on very large samples of English children. Brimer obtained higher average scores for boys on this measure at each age from 6 to 11. He cites a host of studies which indicate that this result is not an artifact of test procedure. King (1959), for example, examined sex differences in paragraph comprehension and found that boys tended to do better on an orally presented test, and girls on a visually presented test. Also using the English version of the PPVT, Clark (1970) tested a large sample of 7-year-old Scottish children (N = 1544), and found that the mean score for boys (100.1) exceeded that

for girls (96.5). However, Maccoby and Jacklin (1974) suggest that Brimer's findings may be related to sex-specific cross-cultural differences.

The following studies represent an attempt to further examine the relationships between sex differences in reading achievement and receptive language abilities and motor expressiveness. The first study replicated the findings of Brimer (1969) and Clark (1970) that sex differences exist in receptive language abilities. Having obtained this result, the second study explored the notion forwarded by McGuinness and Pribram (1979) regarding the "manipulative action" orientation of males (i.e. their motor response to verbal and non-verbal stimuli).

Study 1

Subjects

An elementary school in an urban school district in the Midwest was selected on the basis of its having a fairly representative population of students, according to school district data. Ten teachers, nine female and one male, indicated a willingness to cooperate in the study as did the school principal. All students in two classrooms at each grade level, two through six, were tested, comprising a total sample of 260 children. This sample consisted of 140 males and 120 females. Male-female totals at each grade level ranged between 47 and 55.

It was possible to obtain complete test scores on at least 20 boys and 20 girls each at grades two through six. The mean ages for both males and females at each grade level are presented in Table 1.

Insert Table 1 about here

Instruments

Variables assessed in the study were two measures of receptive language ability, reading achievement, and intelligence.

Receptive Language Ability. Receptive language ability is reflected in tasks requiring that an individual attend to information which is presented orally, and then demonstrate understanding of that information by making a restricted or unrestricted correct response. Two measures which have been used in previous studies were selected to assess receptive language abilities. These tests were the Verbal Word Opposites subtest of the Detroit Tests of Learning Aptitude (Baker & Leland, 1958) and the Peabody Picture Vocabulary Test (Dunn, 1965). It was decided that if performance on these two measures was highly correlated, standard T-scores from each test would be computed, then averaged to yield one receptive language score for individual students.

Reading Achievement. Reading achievement was determined from the Gates-MacGinitie Reading Test (Gates & MacGinitie, 1965). Appropriate forms of this test were used at each grade level.

Intelligence. The Otis-Lennon Test of Mental Ability (Otis & Lennon, 1967) was employed to measure intelligence. This particular group intelligence measure was selected for its ease of administration, and reasonable reliability and validity characteristics. Intelligence was used as a covariate in all analyses throughout the study in order to eliminate the possible confounding effects of this variable.

Results

The Peabody Picture Vocabulary Test and the Verbal Word Opposites Test have each been employed as indicators of receptive language ability

in previous research (variably referred to as listening comprehension). An initial step in the present study was to obtain first order correlation coefficients between these two measures to determine if the tests are, in fact, measuring a similar ability. Results indicate that performance on these measures is highly correlated--.75. Because of this high intercorrelation, student scores were individually converted to T-scores, then averaged to yield a single receptive language score.

To test for sex and grade differences in receptive language ability, a two-way analysis of covariance was used. Using intelligence as a covariate in the analysis, the statistic revealed that the sex main effect was significant. Thus, males and females differed significantly in receptive language ability, $F(1, 237) = 12.12, p < .001$. Table 2 presents means and standard deviations for receptive language ability for both males and females at each grade level. As indicated, males evidenced superiority to females in receptive language ability in this study.¹ The grade main

Insert Table 2 about here

effect, $F(4, 237) = 2.17, p < .07$, failed to be significant; also, the Sex X Grade interaction was not significant, $F(4, 237) = 1.23, p < .30$.

Vocabulary and comprehension raw scores on the Gates-MacGinitie Reading Achievement Test were combined to yield a single reading achievement score for each subject. This was accomplished by converting the scores to T-scores, then averaging the two.

Means and standard deviations on the derived reading achievement measure are presented in Table 3 by sex and grade. As the table indicates,

Insert Table 3 about here

females obtained higher achievement scores than males in the early grades (i.e., grades 2 and 3). However, the apparent advantage disappears in later grades (i.e., grades 4, 5, and 6).

Two analysis of covariance tests were applied to the data to determine if there were differences between males and females in reading achievement in the early and later elementary grade levels. The two analyses were necessary because separate forms of the test were used at each level. Again, intelligence was used as a covariate in the analyses. As expected, female reading achievement scores were significantly higher than male reading achievement scores at the lower elementary grade level (grades 2 and 3), $F(1, 94) = 6.93, p < .01$. In the upper grades (grades 4, 5, and 6), however, females did not perform better than their male peers, $F(1, 154) = .23, p < .64$. Since separate forms of the test were required, no statistical test of a sex by grade interaction could be made, although the data clearly indicate that such an interaction may exist.

The results obtained clearly support Brimer's contention that boys outperform girls on receptive language measures while they perform less well on reading achievement measures. Other studies indicate that the latter is especially the case in the early grades, with girls' reading superiority diminishing in the upper elementary grades (Dwyer, 1973; Gibson & Levin, 1975; Maccoby & Jacklin, 1974; Thorndike, 1973). This is exactly what the present data indicate.

McGuinness and Pribram (1979) view the issue of sex differences in language functioning in slightly broader terms than Brimer, stating, "The male is biased to express his intention in action, and the female in communication" (p. 24). Certainly, there is ample evidence to show that

males are oriented more toward nonverbal expression than females. One might speculate, along the lines laid down by Brimer, that this verbally receptive-motorically expressive "bias" places boys at a distinct disadvantage in learning to read. Interestingly, research shows that physical expressiveness correlates negatively with achievement and IQ test performance for boys (Maccoby, 1966). Reading as an activity, especially in the early grades, may not match well with the nonverbal, motorically expressive orientation of males. In this regard, a number of studies indicate that children of both sexes agree in their classification of reading as an activity more appropriate for girls (Dwyer, 1973).

Study 2

In the second study, the authors attempted to further investigate notions regarding a motor expressive bias in males. The following strategy was employed: First, the regression of reading achievement on intelligence was used to define a level of expected reading performance for a given level of intelligence. Girls and boys whose observed reading scores deviated markedly from their predicted scores were identified, and data relating to classroom behavior of these children were gathered. It was hypothesized that elementary school males whose reading scores were better than expected (i.e., good readers) would evidence significantly less "motor expressiveness" than those males whose scores were worse than expected (i.e., poor readers). No such difference was expected for females.

Subjects

Samples of good and poor reading males and females were identified from the larger sample of 260 subjects described earlier according to

criteria outlined below. The good and poor reader female groups each consisted of 34 subjects. The good and poor reader male groups each consisted of 35 subjects.

Instruments

The School Behavior Check List (SBCL) was used to test hypothesized sex differences in behavioral patterns. This instrument was developed by Miller (1972) from an earlier measure, the Pittsburgh Adjustment Survey Scales (Ross, Lacey, & Parton, 1965). It consists of 96 items and covers a range of student behaviors. Ratings on the SBCL are made by the child's teacher, and items are scored along six scale dimensions: Low Need Achievement (i.e., prosocial behavior and task avoidance), Aggression (i.e., active and passive aggression and hyperactivity), Anxiety (i.e., social withdrawal and manifest anxiety), Academic Disability (i.e., poor academic skills and low intelligence), Hostile Isolation (i.e., schizoid, holds grudges, lacks friends, and refuses to speak) and Extraversion (i.e., self-centered, pushy, and expressive). Test-retest correlations for scales over a 6-week period range from .70 to .90. In this study, interest centered on two scales: Aggression and Hostile-Isolation. Items from these two scales most directly reflect "motor expressiveness".

Procedure

The following procedure was used to select good and poor readers: First, the regression of reading achievement on intelligence was used to define an expected reading score for a given IQ score level. Then a comparison was made of observed versus predicted reading scores. Good readers were defined as those readers whose observed scores exceeded their predicted scores by at least one standard deviation; poor readers were

those readers whose observed scores were one standard deviation below what was expected.

Results

Sex and reading group effects on the six SBCL scales were examined by means of a series of two-way analyses of covariance. Once again, IQ effects were covaried out in the analyses. Raw scores on each scale of the SBCL were converted to T-scores with separate norms being used for each sex (Miller, 1972).

In the present study, interest centered on possible Sex X Reading Group Interactions, particularly on two of the six scales, the Aggression and Hostile-Isolation scales. As Figure 1 shows, subjects' scores on the Aggression scale were affected by a significant Sex X Reading Group interaction, $F(1, 133) = 7.27, p < .008$. Looking first at the male sample, those in the poor reading group clearly evidence much more aggressive, acting-out type behavior than those in the good reading group, at least according to teacher informants. On the other hand, a post-hoc comparison (Tukey) of Aggression scale scores in the female sample fails to reveal a significant difference between subjects in the two reading groups ($p < .30$). There appears to be then, a relationship between motor or behavioral expressiveness and poor reading performance in males, consistent with the hypothesized response mode difference between the sexes.

Although Figure 2 indicates that a similar Sex X Reading Group interaction was obtained on the Hostile-Isolation scale; this turned out not to

Insert Figure 2 about here

be the case, $F(1, 113) = .002, p < .97$. Apparently, there are too few

items ($N = 7$) on this scale to make it a useful measure, a point Miller (1972) himself makes. The Sex X Reading Group interaction did not approach significance on any of the other scales.

Sex and reading group main effects were significant on the Low Need Achievement and Academic Disability scales. Thus, according to their teachers, boys engage in more of the unmotivated type behavior assessed on the Low Need Achievement Scale than girls, $F(1, 133) = 10.84, p < .004$; poor readers as a group are more like boys in this regard than good readers, $F(1, 133) = 11.67, p < .001$. On the Academic Disability scale, males score higher than females, $F(1, 133) = 4.02, p < .05$. This is not surprising given the fact that males in the total sample were reading below females (see above). Poor readers were rated by their teachers as being significantly more disabled academically than good readers, $F(1, 133) = 24.62, p < .001$. This latter finding supports the validity of the teachers' ratings.

Neither sex nor reading level constituted significant main effects on the Anxiety and Extraversion scales.

Summary

In this two-part study, we attempted to examine sex differences in receptive language and behavioral expression which may relate to reading. McGuinness and Pribram (1979) theorize that males and females evidence different "response mode" biases: Males are oriented more toward manipulative action, girls toward communication. Brimer (personal communication) takes this notion a step further, arguing that boys are at a disadvantage in early reading because of the way it is taught, which places a premium

on communicative language functioning (i.e., "making the child speak to print"). To support his contention that the sexes have different processing biases in this regard, Brimer cites research (1969) which indicates that, while elementary school boys are clearly superior to girls in receptive language functioning, they nevertheless lag behind girls in expressive language functioning and in reading achievement.

In the first study reported above, we succeeded in replicating Brimer's finding, especially for the early elementary grade sample. Thus, boys outperformed girls in receptive language ability and yet performed less well in reading achievement. In the second study, we attempted to determine if there was some link between behavioral expressiveness and poor reading performance on the part of males. This notion is based on McGuinness and Pribram's hypothesis that boys evidence a behavioral response bias. Two scales on the School Behavior Check List were directly germane to this hypothesis--Aggression and Hostile-Isolation. In Study 2, poor reading performance in males was related to higher aggression. This was not the case for girls. As for the Hostile Isolation scale, which assesses lack of expressiveness or "passivity", apparently there were too few items on it to obtain meaningful results. Nevertheless, the second study does lend further support to the view advanced here: That boys are oriented more toward a verbally receptive-motorically expressive mode of responding to information, and that this type of "bias" places them at a distinct disadvantage when learning to read.

However, the results obtained, especially in the second study, are correlational in nature and must be interpreted with this in mind. Differences in aggressive behavior correlate with differences in reading achievement for boys; this is not a causal statement. It is equally

possible that boys who read poorly are more likely than girls to evidence aggressive behavior. Only a longitudinal study will provide the necessary information to resolve this issue. However, when the two studies are viewed as a whole, the interpretation ventured above definitely appears worth pursuing: Namely, that differences in the way boys and girls interact with their environment explain the results presented here.

To conclude, many studies have focused on particular attributes of school environments which favor girls' learning performance and school adjustment. These studies have advocated different teaching methods to foster improved learning performance in boys (Stanchfield, 1973; Atkinson, 1968; McNeil, 1964; Lyles, 1966; Fletcher & Atkinson, 1972; Cascario, 1972). Such methods include computer assisted instruction, sex separated classes, male oriented reading materials, and male teachers. Only Brimer suggests using a specific instructional method based on listening as a cognitive strategy which favors boys. His view, that well-documented, early reading difficulties experienced by boys result from an underlying language functioning "difference" as opposed to a "deficit," seems well worth pursuing in further research efforts.

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Footnotes

¹Means presented in Tables 2 and 3 also reflect the effects of IQ differences which were removed in the analysis of covariance. However, the tables contribute to an understanding of trends in the data.

Table 1
Mean Ages in Months
of Males and Females at Each Grade

Sex		Grade Level				
		2	3	4	5	6
Males	$\bar{x}$	90.6	104.4	114.7	126.9	140.8
Females	$\bar{x}$	89.3	102.5	114.8	125.1	136.2

Table 2
 Receptive Language Ability Scores for Males and
 Females in Grades Two Through Six

Sex		Grade Level				
		2	3	4	5	6
Males	$\bar{x}$	51.99	50.59	51.21	50.19	52.53
	sd	9.35	6.47	8.98	9.54	9.96
	n	22	24	32	30	29
Females	$\bar{x}$	48.19	49.47	48.36	50.12	46.94
	sd	7.87	9.97	7.61	7.44	5.69
	n	24	27	20	24	24

Table 3
Reading Achievement Scores for Males and
Females in Grades Two Through Six

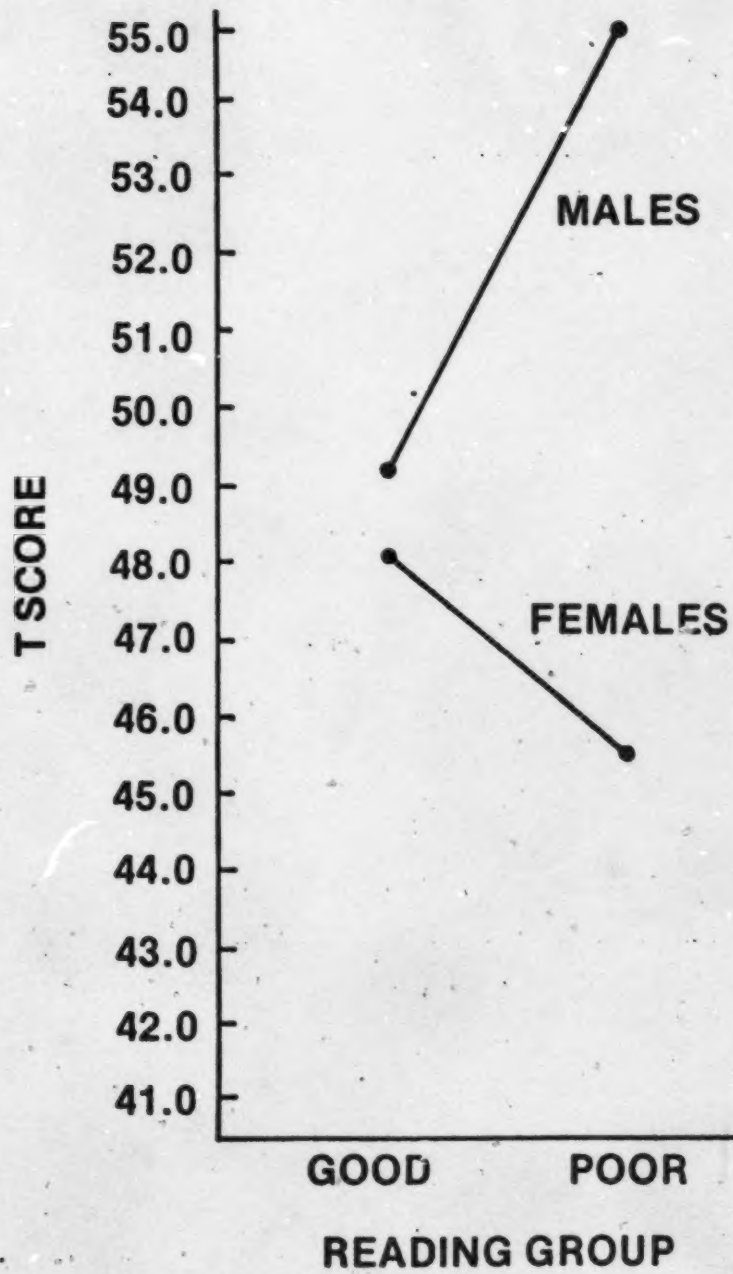
Sex		Grade Level				
		2	3	4	5	6
Males	$\bar{x}$	49.64	47.02	52.34	43.88	45.94
	sd	7.33	10.27	7.91	9.49	12.73
	n	22	25	31	30	27
Females	$\bar{x}$	51.14	55.02	50.43	47.48	45.13
	sd	9.35	7.23	7.27	8.33	6.61
	n	22	27	21	23	24

Figure Captions

Figure 1. Scores of good and poor reading males and females on the Aggression Scale of the School Behavior Checklist.

Figure 2. Scores of good and poor reading males and females on the Hostile-Isolation Scale of the School Behavior Checklist.

AGGRESSION



HOSTILE ISOLATION

